

Table 14. Surface Soil Samples -  
Former

COPC	CAS Number	No. Samples	No. Detects	Frequency of Detection	Maximum Concentration (mg/kg)	Mean Concentration <sup>1</sup> (mg/kg)	VOLATILE OR SEMIVOLATILE
1,1,1-TRICHLOROETHANE	71-55-6	43	3	7%	2	0.050	
2-BUTANONE	78-93-3	43	7	16%	0.062	0.016	
ACETONE	67-64-1	43	35	81%	0.058	0.022	
BENZENE	71-43-2	43	3	7%	0.0085	0.007	
BROMOFORM	75-25-2	43	5	12%	0.028	0.009	
CIS-1,2-DICHLOROETHENE	156-59-2	43	1	2%	0.0094	0.005	
ETHYLBENZENE	100-41-4	43	1	2%	0.0034	0.007	
METHYLENE CHLORIDE	75-09-2	43	1	2%	0.0041	0.007	
STYRENE	100-42-5	43	2	5%	0.17	0.007	
TETRACHLOROETHENE	127-18-4	43	8	19%	0.0066	0.007	
TOLUENE	108-88-3	43	9	21%	0.49	0.016	
TRICHLOROETHENE	79-01-6	43	3	7%	0.026	0.008	
XYLENES (TOTAL) <sup>9</sup>	1330-20-7	43	5	12%	0.054	0.012	
2,4-DINITROTOLUENE	121-14-2	43	1	2%	0.67	1.006	
2-METHYLNAPHTHALENE <sup>10</sup>	91-57-6	43	14	33%	1.6	0.321	
ACETOPHENONE	98-86-2	43	2	5%	0.2	0.196	
BENZALDEHYDE <sup>11</sup>	100-52-7	8	1	13%	0.21	0.208	
BIS(2-ETHYLHEXYL) PHTHALATE	117-81-7	43	13	30%	450	11.239	
CARBAZOLE	86-74-8	43	12	28%	3.3	0.462	
DIBENZOFURAN	132-64-9	43	13	30%	3.3	0.453	
DIETHYLPHthalate	84-66-2	43	9	21%	0.93	0.218	
DI-N-BUTYLPHthalate	84-74-2	43	3	7%	0.14	0.194	
ISOPHORONE	78-59-1	43	5	12%	4.8	0.322	
ACENAPHTHENE	83-32-9	43	8	19%	1.9	0.335	
ACENAPHTHYLENE <sup>12</sup>	208-96-8	43	11	26%	0.35	0.196	
ANTHRACENE	120-12-7	43	19	44%	7.2	0.861	
BENZO(A)ANTHRACENE	56-55-3	43	26	60%	8.9	1.069	
BENZO(A)PYRENE	50-32-8	43	24	56%	6	0.827	
BENZO(B)FLUORANTHENE	205-99-2	43	25	58%	7.3	0.972	
BENZO(G,H,I)PERYLENE <sup>13</sup>	191-24-2	43	21	49%	3	0.480	
BENZO(K)FLUORANTHENE	207-08-9	43	23	53%	2.6	0.468	
CHRYSENE	218-01-9	43	27	63%	6.7	0.892	
DIBENZO(A,H)ANTHRACENE	53-70-3	43	10	23%	0.98	0.415	
FLUORANTHENE	206-44-0	43	31	72%	26	2.836	
FLUORENE	86-73-7	43	12	28%	3.4	0.485	
INDENO(1,2,3-CD)PYRENE	193-39-5	43	22	51%	3.1	0.586	
NAPHTHALENE	91-20-3	43	21	49%	3.6	0.463	
PHENANTHRENE <sup>12</sup>	85-01-8	43	31	72%	25	2.866	
PYRENE	129-00-0	43	28	65%	17	1.855	
AROCLOR-1248	12672-29-6	43	1	2%	0.086	0.020	POLYCHLORINATED BIPHENYL
AROCLOR-1254	11097-69-1	43	5	12%	0.13	0.035	
AROCLOR-1260	11096-82-5	43	3	7%	0.54	0.022	

**Table 14. Surface Soil Samples - Former**

COPC	CAS Number	No. Samples	No. Detects	Frequency of Detection	Maximum Concentration (mg/kg)	Mean Concentration <sup>1</sup> (mg/kg)
ALUMINUM	7429-90-5	43	43	100%	13000	5865.116
ANTIMONY	7440-36-0	43	9	21%	12	1.693
ARSENIC	7440-38-2	43	43	100%	120	22.444
BARIUM	7440-39-3	43	43	100%	5800	362.000
BERYLLIUM	7440-41-7	43	42	98%	1.5	0.551
CADMIUM	7440-43-9	43	38	88%	65	2.491
CALCIUM	7440-70-2	43	40	93%	90000	18552.616
CHROMIUM <sup>13</sup>	7440-47-3	43	43	100%	38	12.033
COBALT	7440-48-4	43	43	100%	13	6.916
COPPER	7440-50-8	43	43	100%	820	55.307
CYANIDE	NL	43	15	35%	1.2	0.161
IRON	7439-89-6	43	43	100%	72000	21213.953
LEAD	7439-92-1	43	43	100%	1600	111.433
MAGNESIUM	7439-95-4	43	43	100%	10000	2506.977
MANGANESE	7439-96-5	43	43	100%	1500	380.000
MERCURY, TOTAL	7439-97-6	43	27	63%	17	0.722
NICKEL	7440-02-0	43	43	100%	47	12.665
POTASSIUM	7440-09-7	43	42	98%	1400	663.140
SELENIUM	7782-49-2	43	39	91%	8	1.571
SILVER	7440-22-4	43	2	5%	1.8	0.508
SODIUM	7440-23-5	43	28	65%	1600	307.731
THALLIUM	7440-28-0	43	4	9%	3.8	0.981
VANADIUM	7440-62-2	43	43	100%	22	12.765
ZINC	7440-66-6	43	43	100%	3900	300.349

**NOTES:**

CAS =Chemical Abstract Service

COC = Contaminant of Concern

COPC = Contaminant of Potential Concern

LOD = Level of Detection

mg/kg = milligram per kilogram

NE = Not Established

NL = Not Listed

NOC = Not Of Concern

VRRA = Voluntary Remediation and Redevelopment Act  
1 = One-half the detection level was inserted to calculate mean concentrations if analyte was not detected above the LOD.

2 = Refer to Tables for 95% Upper Confidence Limit (UCL) calculations.

3 = Natural background calculated plus two standard deviations per the WV VRRA Guidance manual Table 2-3 and Appendix B.

4 = Values calculated using Johnson and Ettinger Model for Subsurface Vapor Intrusions into Buildings.

5 = *Soil, Industrial and Commercial Generic Cleanup Criteria and Screening Levels*, Table 3, Part 201, Environmental Remediation, Michigan Nat

6 = Migration to Groundwater values obtained from VRRA Guidance Manual.

7 = Risk-Based values obtained from VRRA Guidance Manual.

8 = Uniform Standards calculated per VRRA Guidance Manual.

9 = Johnson-Ettinger Model - Soil RBCs for total xylene have not been established. This assessment uses the RBCs for m-Xylenol in soil as the ref

10 = The value for naphthalene was used to evaluate 2-methylnaphthalene per WVDEP.

11 = SGS/CT&E laboratory capabilities during the initial ESA soil samples submittal were unable to provide a quantifiable LOD for benzaldehyde.

12= Risk-based values obtained from WVDEP Supplemental Guidance on Polynuclear Aromatic Hydrocarbons (October 2002).

13 = RBC's for total chromium in soil have not been established. This assessment uses the RBCs for chromium VI in soil as the reference standard f

Highlighted and bolded entries indicate that the maximum concentration or 95% UCL exceeds a screening value.

Table 15. Uniform Risk-B

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Former

CAS No.	COPC	C mg/kg	TR risk	BW <sub>a</sub> kg
7440382	Arsenic	38.04	1.00E-05	70

## Equation #1 D-3: Combined Exposure Carcinogenic Contaminants in Industrial Soil - Site Worker Scenario

CAS No.	COPC	C mg/kg	TR risk	BW <sub>a</sub> kg
7440382	Arsenic	476.57	1.00E-05	70

## Equation #1 D-3: Combined Exposure Carcinogenic Contaminants in Industrial Soil - Construction Site Worker Scenario

$$C(mg / kg) = \frac{TR \times BW_a \times AT_c}{EF_o \times ED_o \left[ \left( \frac{IRS_o \times CSF_o}{10^6 mg / kg} \right) + \left( \frac{IRA_a \times CSF_i}{VF_s \text{ or PEF}} \right) \right]}$$

## Equation #1 D-3: Combined Exposure Carcinogenic Contaminants in Industrial Soil - Visitor/Trespasser Scenario

Description	Source
C	Uniform Standard concentration
TR	Target Risk
BW <sub>a</sub>	Body Weight - adult (kg)
AT <sub>c</sub>	Averaging Time - carcinogen (days)
EF <sub>o</sub>	Exposure Frequency - occupational (days/year)
ED <sub>o</sub>	Exposure Duration - occupational (years)
IRS <sub>o</sub>	Soil ingestion - occupational (mg/day)
IRRA <sub>a</sub>	Inhalation rate, adult (m <sup>3</sup> /day)
CSF <sub>o</sub>	Cancer Slope Factor - oral (mg/kg-d) <sup>-1</sup>
CSF <sub>i</sub>	Cancer Slope Factor - inhalation (mg/kg-d) <sup>-1</sup>
PEF	Particulate Emissions Factor
VF <sub>s</sub>	Volatilization Factor - soil (m <sup>3</sup> /kg)

See Equation #2 below, WV VRRA Guidance Manual